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ABSTRACT

Validation and cross-validation studies were conducted using the Minnesota Multiphasic Personality Inventory (MMPI) and Inwald Personality Inventory (IPI) to predict job performance for 698 urban male police officers who completed a six-month training academy. Job performance criteria evaluated included absence, lateness, derelictions, negative reports, positive reports, assignment to restricted duty, and two supervisory ratings. The subjects were randomly divided into analysis (n=421) and cross-validation samples (n=277). Equations based on the IPI alone accurately identified a minimum of two out of three officers on 75 percent of the performance criteria studied. In contrast, only 38 percent of the MMPI prediction equations reached this rate. Multiple correlations of the IPI with performance ranged from .16 to .34, while MMPI correlations ranged from .05 to .16. Compared to chance classification, the IPI reduced error in "poor" 333 performance predictions in cross-validation samples by 19 percent to 52 percent while the MMPI rates were 8 percent to 38 percent on six of the criteria studied. (Author)

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A Cross-Validation Study of Police Recruit Performance as Predicted by the IPI and MMPI

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Abstract

Validation and cross-validation studies were conducted using the MMPI (Minnesota Multiphasic Personality Inventory) and IPI (Inwald Personality Inventory) to predict job performance for 698 urban male police officers who completed a six-month training academy. Job performance criteria evaluated included absence, lateness, derelictions, negative reports, positive reports, assignment to restricted duty, and two supervisory ratings. The subjects were randomly divided into analysis (n=421) and cross-validation samples (n=277). Equations based on the IPI alone accurately identified a minimum of two out of three officers on 75% of the performance criteria studied. In contrast, only 38% of the MMPI prediction equations reached this rate. Multiple correlations of the IPI with performance ranged from .16 to .34, while MMPI correlations ranged from .05 to .16. Compared to chance classification, the IPI reduced error in "poor" 333 performance predictions in cross-validation samples by 19% to 52% while the MMPI rates were 8% to 38% on six of the criteria studied.

A Cross-Validation Study of Police Recruit Performance as Predicted by the IPI and MMPI

In the highly stressful, unpredictable environment of police work, officers must have the emotional resources to perform multiple tasks. They need a certain amount of dominance and assertiveness to enforce the law, and, at the same time, restraint and self-control to maintain the peace. They must be able to tolerate a high level of provocation, ambiguity, and the ever-present threat to physical safety. Such attributes as anxiety, misperception, impulsivity, low assertiveness and withdrawal can be highly detrimental to police work (Hargrave & Berner, 1984).

Courts have called pre-employment psychological testing a responsibility of law enforcement departments when it contributes to increased protection of citizens ar officers (Bonsignore v. City of New York, 1981; Conte v. Horcher, 1977; McKenna b. Fargo, 1978). Many agencies have chosen to institute psychological testing to better identify those candidates who would have difficulty coping with physical and emotional pressures and whose behavior might escalate incidents into life-threatening situations.

In the implementation of screening programs, however, departments are subject to conflicting pressures. On one hand, they must try to screen out those officers whose unauthorized actions or poor judgment would lead to incidents creating legal

liability (or departmental negligence) and damaged relations with the public (Kuhn, 1981; Rittenmeyer, 1984). On the other hand, there is a legal obligation to use fair and equitable screening methods and criteria, whose job-relatedness is unassailable. Increasingly, then, it has become important to identify which screening measures, alone and in combination, can best meet the demands of predictive validity according to professional and governmental standards.

In the past fifteen years, there have been a number of investigations of the effectiveness of psychological inventories in predicting the behavior of police officers (French, 1973; Hargrave & Berner, 1984; Hogan and Kurtines, 1975; Spielberger, 1979). Many studies have focused on the MMPI, due to its established relationship to patterns of psychopathology and its widespread use in screening programs (Murphy, 1972). These studies have tried to determine the relationship between various scales and job performance criteria for police. A variety of criteria have been used, including academy performance, supervisory ratings, peer ratings, the incidence of absence, commendations, misconduct charges, and job retention or termination (Roe and Roe, 1982; Hargrave & Berner, 1984). While these studies have pointed to some relationship between the MMPI scales and various criteria, they have not accounted for considerable variance, suggesting that other factors play an important role in predicting law enforcement performance. It has been observed that while the MMPI appears to be an excellent gauge of pathological behaviors, it is not always so helpful in

identifying the more "characterological" behavior patterns within the less pathological range - such as those indicative of antisocial or excessive dependent tendencies - which also appear to impair law enforcement performance (Inwald, Knatz, and Shusman, 1983).

Psychopathology, thus, may not be the only information relevant in personnel selection decisions (Costello, Schoenfeld, & Kobos, 1982). Research suggests an officer who lacks impulse control, tends to withdraw (Baehr, Furcon, & Froemel, 1968), disregards rules, is suspicious of others (Lawrence, 1984), or is perfectionistic or rigid (Reiser & Geiger, 1983) may have on-the-job difficulties. Empirical research findings indicate past behaviors can be related to future job performance (Poland, 1978; Smith & Klein, 1984). Work and military histories, prior trouble with the law, and data on past and present interpersonal relationships appear to affect one's suitability to the law enforcement occupation (Johnson, 1984).

The Inwald Personality Inventory (IPI) was developed specifically to measure personality attributes and behavior patterns of law enforcement candidates (Inwald, Knatz, and Shusman, 1983). This instrument is a 310-item true-false questionnaire, consisting of 26 scales designed to measure stress reactions and deviant behavior patterns including absence and lateness problems, interpersonal difficulties, antisocial behaviors, and alcohol or drug use. Suspicious, anxious, and rigid tendencies are also asssessed by IPI scales. Item content was gathered from many sources, including over 2,500 interviews

with law enforcement officer candidates and officers responsible for training new recruits. Officers on active duty and others on restricted duty also aided in the development of the item pool. Areas emphasized by the above three groups were clustered by the test developer. Using descriptions of behaviors and statements from the candidates, items were composed to define targeted constructs. The IPI has been normed on a number of law enforcement populations both by gender and ethnicity.

Initially, the IPI was compared to the MMPI for predictive validity in a validation and cross-validation study of 716 male correction officer recruits, using job retention or termination, absence, lateness and disciplinary measures in the first ten months of service as performance indicators (Shusman, Inwald, and Landa, 1984). The study revealed that, for most performance criteria, IPI scales classified officers correctly as to problematic behaviors more often than did the MMPI scales, and that the combination of IPI and MMPI scales increased classification accuracy.

A validation study on 329 police recruits, using discriminant function analysis with IPI and MMPI scales to predict academy performance (including absence, lateness, injuries, disciplinary measures, commendations and supervisory ratings) produced similar results (Inwald and Shusman, 1984). Again, the IPI scales alone showed a higher classification rate on performance indicators than did the MMPI, and the combined IPI-MMPI scales increased accuracy. For all indicators, there were more IPI than MMPI scales that discriminated successfully.

As expected from the research on law enforcement officer performance, the best predictors of problematic behavior were IPI scales measuring trouble with the law, previous job difficulties, and involvement with drugs.

The present study is a continuation of the validation research on police trainee performance. It consists of a cross-validation study of an enlarged sample of police recruits, which compares and constrasts the classification accuracy of the MMPI and the IPI.

Method

Subjects

The subjects of this study were 698 male urban police officers who completed a six-month training academy. The total group was randomly divided into analysis (n=421, or 60%) and cross-validation samples (n=277, or 40%).

The racial composition of the analysis sample was 73% white, 14% black and 13% hispanic. Ages ranged from 19 to 32, with the average age being 24.

Seventy-seven percent of the cross-validation sample were white, 12% were black, 10% were hispanic, and 1% (n=3) identified themselves as "other". The officers ranged in age from 19 to 34, with the average age in this sample being 24.

All applicants were required to meet a minimum educational level of a high school degree or its equivalent. Comparison of frequencies of many biographical variables between the analysis and cross-validation samples showed no statistically significant differences. Data were collected on racial group membership,

age, educational attainment, marital status, military history, employment stability, and arrest history.

Design and Procedure

All subjects were required to complete the MMPI, IPI, the SKIL Scale Inventory (a symptom checklist), and a "Law Enforcement Personal History Questionnaire" as part of the application process. After scoring of the paper-and-pencil psychological measures, candidates were individually interviewed by a psychologist, and, based upon these data, were assigned ratings as to their potential "suitability" or "unsuitability" for the job. Simultaneously, independent investigations of candidates' backgrounds were conducted by experienced police officer investigators. Results of both examinations were then sent to the Director of Personnel where a hiring decision was made. Thus, the majority of applicants with questionable backgrounds and/or negative psychological screening results were removed from the sample.

Data for the job performance criteria and ratings were gathered from records kept on each hired male attending a six-month academy in this large, urban police department. All ratings were made as part of the administrative process and were not originally designed for use as research tools. Thus, this agency had determined that these categories were relevant in the evaluation of recruit performance.

Criteria were dichotomized for study because the majority of officers adhered to departmental rules during this probationary period. If the criteria were examined as continuous variables in

multiple regression analyses, prediction lines would be largely determined by the most populated end of the frequency curve (e.g. one absence). Thus, identification of the poor performers, the smaller group, would not be possible using such methodology. Eight variables were studied as follows:

1. less than three times absent versus three or more times absent,
2. less than three latenesses as opposed to being late three or more times,
3. no derelictions (formal disciplinary actions) versus one or more,
4. no assignment to restricted duty as compared to one or more such placements,
5. zero or one negative report versus two or more of the same,
6. zero or one positive report versus two or more positive reports,
7. Those rated "well-above", "above", and "average" in their performance as compared to those "below" to "well-below average" and, finally,
8. Those who exhibited "leadership potential" in the academy as opposed to those who demonstrated attitude problems.

The criteria will be referred to by number in tables, when necessary.

While, statistically, it may be more appropriate to define the positive and negative performance categories at the median of

the frequency distribution, with two measures this standard was found too stringent. Thus, rather than permitting no incidents of absence or lateness, two times absent and late per officer was considered within the range of "good" performance. The final two criteria were supervisory ratings based on one supervisor's assessment of a subordinate officer's performance. With the exceptions of absence and lateness, the only available criteria of job performance in this applied setting were subject to shortcomings typically found in criteria (Thorndike, 1982).

The standard thirteen scales and one experimental scale, MacAndrews Alcohol (ALCMC), of the MMPI and the 26 IPI scales were used in discriminant function analyses. Equations were developed on a randomly selected 60% of the total sample for the IPI alone, the MMPI alone, and for the IPI and MMPI together. The Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975) was used for all stepwise (Wilks' Lambda) analyses. The discriminant fun ions were used to classify officers as to predicted job performance.

The discriminant function equations were subsequently applied to the remaining 40% of the officers. A classification analysis was used in this cross-validation procedure to ascertain the degree of shrinkage.

To conserve space, the following labels have been given to the IPI and MMPI scales:

IPI- Guardedness - GD, Rigid Type - RT, Alcohol Use - AL,
Drug Use - DG, Substance Abuse - SA,
Driving Violations - DV, Job Difficulties - JD,

Trouble with the Law/Society - TL,

Antisocial Attitudes - AS, Hyperactivity - HP,

Absence Abuse - AA, Illness Concerns - IC,

Treatment Programs - TP, Anxiety - AN,

Type A Personality - TA, Phobic Personality - PH,

Lack of Assertiveness - LA, Obsessive Personality - OB,

Depression - DE, Loner Type - LO,

Interpersonal Difficulties - ID, Family Conflicts - FC,

Spouse/Mate Conflicts - SP, Sexual Concerns - SX,

Undue Suspiciousness - US, and

Unusual Thoughts/Experiences - UE

MMPI- MacAndrews Alcohol - ALCMC, Validity scales - L, F, K,

Hypochondriasis - Hs, Depression -D,

Hysteria - Hy, Psychopathic Deviate - Pd,

Masculinity-Femininity - Mf, Paranoia - Pa,

Psychasthenia - Pt, Schizophrenia - Sc,

Hypomania - Ma, and Social Introversion - Si.

Results

Distinct aspects of male police officer job performance were studied. Intercorrelations showed little relationship between the criteria, with some exceptions (see Table 1). Officers who

Insert Table 1 about here

were tardy (#2 on table) had a higher number of negative reports (#5), (r=.65) and were labeled as "attitude problems" by supervisors (#8), (r=.36). Some relationship was also seen between the number of positive reports (#6) issued and the final rating (#8), (r=-.34). Low intercorrelations (r<=.30) among the

remaining criteria suggest supervisors rated performance in one area independent of behaviors in any other evaluated category.

Multiple correlations between job performance and discriminant scores ranged from .16 to .34 for the IPI, between .05 and .22 for the MMPI, and from .20 to .47 for the tests combined (see Table 2).

Insert Table 2 about here

Table 3 shows that in the validation sample (n=421), the

Insert Table 3 about here

discriminant function based on IPI scales alone assigned from 61% to 77% of the officers into correct group membership. MMPI scales identified between 50% and 70% while equations including scales from both inventories classified from 64% to 87% of the male officers. From Table 3 it can be seen that on cross-validation (n=277), between 53% and 73% of the officers were correctly predicted by the IPI. Forty-three percent to 75% of this group were accurately identified by the MMPI. Together, the tests classified between 57% and 75% of this sample.

More shrinkage is expected between the validity and cross-validation samples by the equation with the larger number of predictors. Slightly more shrinkage was observed for the IPI than for the MMPI in most of the criteria. It is significant, however, that even with a somewhat greater degree of shrinkage, the cross-validation classification rates for the IPI were equal to or greater than the original validation percentages from the MMPI alone for all but the restricted duty criterion. Thus, predictions by IPI equations applied to an unknown sample were as

good as or better than predictions by the MMPI for the original analysis. It should be noted that the equations for the original analysis group capitalized on idiosyncratic characteristics, whereas the IPI cross-validation equations did not have this advantage.

Table 4 lists the hit rates for the "good" and "poor"

Insert Table 4 about here

performance groups. An important guide for assessing the adequacy of the equations is the percentage of prediction error prevented by application of the equation that would have been produced for the "poor" performance group if no information was gleaned from pre-employment testing (Huberty, 1984). To assess the degree of improvement over chance classification, the cross-validation "poor" performance prediction rates reported in Table 4 were used in Huberty's (1984) equation. It was found that the IPI alone reduced the percentage of error by 19% (derelictions) to 52% (absences) while the MMPI improved hit rates over chance from 8% (final rating) to 38% (latenesses). Neither the IPI nor MMPI were able to predict positive or negative reports better than chance.

An investigation of the discriminant functions provides a basis for comparison of IPI and MMPI scale significance. The majority of IPI-MMPI combination equations reflect a greater weight of IPI scales in discriminating between performance groups (see Table 5).

Insert Table 5 about here

Discussion

An interesting comparison of the IPI and MMPI concerns the differences between these two tests in gathering information on personality characteristics of the examinee. Items on the IPI inquire about attitudes as well as past and present behaviors (biographical information). The items were selected specifically for their relevance to performance in the law enforcement field. MMPI items also follow this format, yet were designed to assess the symptoms of pathology.

A history of difficulties with previously held jobs (JD), a suspiciousness of others (US), and anxiety directed towards the environment (PH) were most frequently of importance to separating the "good" and "poor" performance groups as supplied by the IPI. Alcohol use (ALCMC) and deviation from societal norms (Pd and K) were areas of the MMPI most heavily weighted in the functions. It appears that behavioral difficulties and an uneasiness with physical surroundings and others may be among the best indicators of future police performance. The desire to put oneself in the "best possible light" may influence a supervisor's evaluation to some degree.

When examining the contribution psychological testing makes in the selection of officer candidates, it is of value to look at the "poor" performance category. The objectives of psychological screening are numerous. For example, documentation of alcohol and drug use may be important in a court case involving a specific officer. Individuals who may be unable to control crisis situations must be identified. Similarly, those who may

overreact and perhaps precipitate a crisis must also be "weeded out" before hiring. Above all, it is desired that officers will execute their duties in a safe and efficient manner by following the rules, regulations, and procedures of their hiring agencies.

From this viewpoint, psychological testing provides a great deal of information to those individuals making hiring decisions. Incidence of absence is one example where testing increases decision making power. While the base rate is only 5% in the cross-validation sample, the IPI hit rate is 54%. Thus, with the IPI, almost eleven times more officers were correctly identified as having a poor absentee record than would have been accurately identified without the inventory.

The number of false positives and false negatives is of concern. Adjusting the cut points for the criteria could alter these figures, but this solution would ignore the frequency of behaviors typical for males within the first six months of employment. Incorrect predictions highlight the importance of using psychological profiles only as one component of a comprehensive screening process. What the present figures indicate is that, overall, there are fewer misses using IPI behavioral/biographical data when compared to hit rates based solely on the pathology-oriented MMPI scales.

These results most likely are underestimates of the true classification rates. In an applied setting, it is impossible to hire all job candidates. The pre-employment screening system generally prevents individuals with severely abnormal behaviors and personality characteristics (IPI and MMPI scale t-scores

above 70) from entering the department. This is important in law enforcement agencies, where a department may be held negligent for hiring candidates with questionable backgrounds and/or "poor" psychological testing results. In the present research, less than 3% of the hired officers were considered to be psychologically unsuited for law enforcement duties based on test results and a psychological interview. Thus, while this study suggests the ability to predict behavior in previously screened officers, the rates of false negatives and false positives would probably decrease with an unscreened candidate sample. Similarly, in more homogeneous samples, observed correlations are lower than the population coefficients. With a more heterogeneous candidate sample, the validity coefficients would be more reflective of the true validity.

The goal of this research and other similar studies is to accumulate evidence that pre-employment psychological inventories are valid for screening purposes. One way to increase classification rates and to make more accurate probability statements for individual candidates would be to improve criteria definitions. Unfortunately, while a minimum of absences and latenesses are necessary for successful completion of duties, job performance cannot be evaluated solely on these purely objective variables. Other informative criteria are subject to the judgments of the supervisor. For example, a supervisor may decide to informally reprimand or praise an officer. Thus, some behaviors which may be recorded by one supervisor may only be orally communicated to the subordinate by a different supervisor.

Two of the variables, overall rating and final rating, were based exclusively on the supervisor's judgment. Certainly "halo effects" and the desire to have "their" workers reflect positively towards them play a role in such ratings. Validity of the screening tools are reduced by the possible lack of reliability of the criteria.

In spite of this shortcoming and the restriction of range in test scores, the IPI and MMPI predict a greater number of officers as to job performance than would be expected by chance alone. This research was consistent with findings of prior research that the IPI is a more able classifier than is the MMPI. Of course, more unique information from different sources increases predictive validity. In some cases, the more pathologically-based MMPI scales added to the behavioral/biographical information gathered by the IPI.

The results of this study are encouraging. Although no pre-employment psychological screening program can predict how each candidate will later behave as an officer, pre-employment identification of individuals with a high probability of "unsuitable" job behavior can save any hiring institution administrative time and monies. Screening out potential poor performers is especially crucial for the safety and protection of the public and of fellow officers. To defend any hiring decisions made, validity studies must be conducted. It is hoped that the findings reported here for a large urban police department will advance the current state of psychological screening of law enforcement candidates and promote similar

research in other agencies across the country.

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Table 1

Correlation Matrix for the Eight Job Performance Measures

Criterion	1	2	3	4	5	6	7	8
1	1.00							
2	.12	1.00						
3	.11	.29	1.00					
4	.17	.13	.05	1.00				
5	.15	.65	.30	.13	1.00			
6	.03	.01	.08	.14	.13	1.00		
7	.01	.16	.09	.10	.15	.23	1.00	
8	.08	.36	.14	-.07	.25	-.34	.09	1.00

Table 2

Multiple Correlations Between Dichotomous Performance Criteria and IPI, MMPI, and IPI-MMPI Prediction Equations for the Validation Sample

Criterion	IPI	MMPI	IPI-MMPI
Absences	.20	.05	.20
Latenesses	.32	.14	.35
Derelictions	.22	.18	.31
Restricted Duty	.16	.22	.27
Negative Reports	.34	.20	.34
Positive Reports	.25	.17	.29
Overall Evaluation	.18	.13	.25
Final Rating	.30	.22	.47

Table 3

Overall Correct IPI, MMPI, and IPI-MMPI Prediction Rates on Eight Performance Criteria for Validation and Cross-Validation Samples

Criterion	Validation Sample			Cross-Validation Sample		
	IPI	MMPI	IPI-MMPI	IPI	MMPI	IPI-MMPI
Absences	67%	59%	67%	63%	56%	63%
Lateness	77%	70%	76%	70%	75%	74%
Derelictions	70%	65%	76%	73%	60%	75%
Restricted Duty	67%	66%	68%	57%	58%	60%
Negative Reports	66%	55%	64%	57%	56%	59%
Positive Reports	61%	57%	64%	57%	52%	57%
Overall Rating	61%	50%	64%	53%	43%	59%
Final Rating	74%	69%	87%	72%	55%	70%

Table 4

Separate Group Classification Accuracy of Performance Criteria for Validation and Cross-Validation Samples

Criterion/N		Validation			N	Cross-Validation		
		IPI	MMPI	Both		IPI	MMPI	Both
1.	397<3	66%	59%	66%	264<3	63%	57%	63%
	24<=3	71%	63%	71%	13<=3	54%	39%	54%
2.	390<3	77%	72%	77%	254<3	73%	78%	78%
	31>=3	74%	48%	71%	23>=3	35%	44%	35%
3.	383=0	71%	65%	76%	254=0	77%	64%	81%
	38>=1	53%	61%	71%	23>=1	26%	22%	13%
4.	376=0	68%	65%	68%	236=0	61%	63%	67%
	45>=1	60%	67%	69%	41>=1	34%	29%	20%
5.	230<=1	67%	57%	67%	130<=1	62%	62%	65%
	191>=2	64%	52%	61%	147>=2	52%	51%	53%
6.	204<=1	62%	59%	64%	131<=1	55%	53%	54%
	217>=2	61%	54%	63%	146>=2	57%	51%	60%
7.	367-Above	60%	47%	63%	234-Above	52%	44%	62%
	53-Below	68%	66%	72%	43-Below	56%	40%	40%
8.	170-Leader	75%	68%	87%	115-Leader	77%	61%	79%
	10-Problem	70%	90%	90%	19-Problem	42%	21%	16%

Table 5

Beta Weights for IPI Scales and MMPI Scales Used in IPI-MMPI Prediction Equations for Job Performance Criteria

	Criterion							
Scale	1	2	3	4	5	6	7	8
IPI								
GD	----	-.25	----	-.31	----	----	-.38	----
RT	----	.47	----	----	----	----	----	----
AL	----	.30	.30	----	----	.38	----	----
DG	----	-.24	----	----	----	----	-.42	----
SA	----	-.26	-.60	----	----	.36	----	----
DV	----	----	.21	.21	-.24	----	----	.48
JD	.71	.48	----	----	.63	----	.55	----
TL	----	.33	----	----	.59	----	----	----
AS	----	----	----	----	----	----	----	----
HP	----	----	.60	----	----	----	----	----
AA	----	-.30	----	----	-.48	-.39	----	-.46
IC	----	-.20	-.54	.23	----	----	----	----
TP	----	-.29	----	----	----	----	.24	-.34
AN	----	----	----	----	.19	-.55	----	-.33
TA	----	-.44	----	----	----	----	----	.46
PH	.47	----	----	.49	----	-.60	-.49	----
LA	----	----	----	----	-.29	.46	.39	----
OB	----	.46	----	----	-.35	.59	----	----
DE	-.51	.37	.61	----	----	----	----	----

(table continues)

LO	.61	----	----	----	----	----	----	-.38
ID	-.68	-.35	-.28	----	----	----	----	----
FC	----	----	.29	----	----	----	-.24	.39
SP	----	----	-.24	-.29	-.32	----	----	-.42
SX	----	----	----	----	----	.20	-.23	----
US	----	-.31	----	----	.49	----	----	.42
UE	.32	----	----	----	----	----	----	----
MMPI								
ALCMC	----	.32	----	.34	----	-.23	----	.27
L	----	----	----	.63	----	----	----	-.51
F	----	-.16	-.23	----	----	-.30	----	-.31
K	----	----	.45	----	----	----	-.52	.54
Hs	----	.23	.39	.31	-.18	-.30	----	-.26
D	----	----	----	----	-.38	----	----	-.25
Hy	----	----	----	.38	----	----	----	.41
Pd	----	----	.39	-.45	----	.20	----	.66
Mf	----	----	----	----	----	.31	----	.19
Pa	----	----	----	-.36	----	.20	.31	-.33
Pt	----	----	----	----	----	----	----	----
Sc	----	-.27	----	----	----	----	.58	----
Ma	----	----	----	----	----	----	----	----
Si	----	----	----	----	----	----	----	----